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NEW RECORDS AND DESCRIPTIONS OF POLYDESMOID MILLIPEDS (ORDER POLYDESMIDA) FROM THE EASTERN UNITED STATES

By Nell B. Causey

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Holotypes of the species described here will be deposited in the permanent collection of the American Museum of Natural History. Paratypes and other specimens, except those from Kentucky, are in the collection of the author. The Kentucky specimens were collected chiefly by the late Prof. Harrison Garman and are the property of the Department of Entomology and Botany, University of Kentucky. All specimens for which no collectors are mentioned were taken by the author with the assistance of Dr. David Causey.

Family Polydesmidae

Genus *Pseudopolydesmus* Attems 1898

Pseudopolydesmus minor (Bollman)

Polydesmus minor Bollman, 1888. Ent. Amer. 4:2 (Little Rock, Pulaski Co., Arkansas).

Pseudopolydesmus minor, Chamberlin, 1942. Bull. U. Utah, biol. ser. 6(8):19, fig. 32.

Record: *Arkansas*, Desha Co., McGehee, numerous specimens under logs on a burnt over area, Jan. 7, 1954.

Pseudopolydesmus pinetorum (Bollman)

Polydesmus pinetorum Bollman, 1888, Ent. Amer. 4:2-3 (Little Rock, Pulaski Co., Arkansas).

Pseudopolydesmus pinetorum, Causey, 1952, Nat. Hist. Misc. 106:6, fig. 5.

Records: *Arkansas:* Dallas Co., Princeton, Jan. 7, 1954. *Kansas:* Riley Co., Apr. 2, 1952, L. O. Warren. *Kentucky:* Jefferson Co., Louisville, Apr. 4, 1922, F. E. Merriman, "ground just covered with these;" Fayette Co., Lexington, Mar. 17, 1922, Arthur Stone.

Pseudopolydesmus serratus (Say)

Polydesmus serratus Say, 1821, Jour. Philadelphia Acad. Sci. 2:106-107.

Pseudopolydesmus serratus, Causey, 1952, Nat. Hist. Misc., 106:6.

Records: *Kentucky:* Anderson Co., Tyrone; Carstian Co., Hopkins-

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ville; Fayette Co., Lexington, H. Garman; Fulton Co., Hickman, collector unknown. *Mississippi:* Lincoln Co., 12 miles east of Brookhaven, Dec. 25, 1953.

Genus *Scytonotus* C. L. Koch 1847

Scytonotus granulatus (Say)

Polydesmus granulatus Say, 1821, Jour. Philadelphia Acad. Sci. 2: 107 (Pennsylvania).

Scytonotus granulatus, Cook and Cook, 1895, Ann. New York Acad. Sci. 8(5):238-246, figs. 46-62.

Records: *Kentucky:* Fayette Co., Lexington, Apr. 9, 1892, Feb. 25, Mar. 2, 1895; Hopkins Co., Nortonville, Mar. 8, 1891, H. Garman.

Family Euryuridae Pocock

Euryuridae, Hoffman, 1951, Proc. U. S. Nat. Mus. 102(3300):235-243.

As a rule, the three genera of the Family Euryuridae that are known in the United Statse are most abundant in the states that border on the Mississippi and Ohio rivers. Species of *Auturus* tend to occur west of the Mississippi River, species of *Euryurus* east of it, while *Singuliurus* is known only from the type locality in Mississippi. Since the somatic characters are so close in these three genera, they are best separated by the gonopods of adult males, as in the following key:

1 (2) Tibio-tarsal region of gonopods much shorter than prefemoro-femoral region, the divisions of the bifid apex coarse and of uneven width ..... *Auturus*

2 (1) Tibio-tarsal region almost as long as prefemoro-femoral region; if the apex is bifid the division are narrow and are of even width 3

3 (4) Apex of tibio-tarsus bifid ..... *Euryurus*

4 (3) Apex of tibio-tarsus simple ..... *Singuliurus*

Genus *Auturus* Chamberlin 1942

Auturus evides (Bollman)

Paradesmus evides Bollman, 1887, Ent. Amer. 2:229 (Winona, Winona Co., Minnesota).

Auturus evides, Chamberlin, 1942, Bull. U. Utah, biol. ser. 6(8):7.

Auturus florus Causey, 1950, Ent. News 61(2):37-38, figs. 1, 2.

Records: *Wisconsin:* Pierce Co., Maiden Rock, one male, one female; July 5, 1954, L. and H. W. Levi. *Missouri:* St. Louis Co.; one male, one female, larvae, Mar. 9, 1952, E. P. Meiners. *Illinois:* Vermillion Co., Oakwood, one male, May 1, 1943, A. H. Ross. *Arkansas:* Polk Co., Rich Mt., one male, three females, Apr. 25, 1953; Washington Co., Fayetteville, numerous specimens.

Auturus louisiana (Chamberlin)

Euryurus louisiana Chamberlin, 1918, Ann. Ent. Soc. Amer. 11:371 (Creston, Natchitoches Par., Louisiana).

Records: *Louisiana,* Natchitoches Par., Grand Ecore, Feb. 28, 1954, one male, J. E. Sublette. *Arkansas:* Clark Co., Arkadelphia, Apr. 15, 1953; Polk Co., Shady Lane Recreational Area, one male, one female, Herndon Dowling; Sevier Co., Wilton, Dec. 22, 1950, one male, one larva. Garland Co., Hot Springs, one male, May 10, 1951, Ruth Crozier.

Auturus mcclurkini, new species

Figure 1

Diagnosis: Gonopods distinguished from those of all other species of the genus by the curvature in the prefemur-femur and the slightly longer tibio-tarsus.

Male holotype: Width 3.2 mm., length about 22 mm. Colors not developed. Details of the exoskeleton are typical of the genus. Anterior angles of segments two through 18 have the usual minute tooth, and the apex of the anal tergite is broad, with the lateral and caudal margins straight and the corners narrowly rounded. Gonopods also typical of the genus, but the bend in the prefemur-femur is unusual. *In situ* the basal halves of the telopodites are parallel; beyond the bend the direction is meso-ventrad, so they cross at about the end of the femur. Prefemur-femur incompletely setose, as shown in figure 1; tibio-tarsus is a bright amber color, contrasting with the pale yellow of the remainder of the telopodite.

Type locality: Tennessee, Jackson Co., Jackson, in rotting log, one male, Apr. 18, 1954, Irving McClurkin.

Genus *Euryurus* C. L. Koch 1847

Euryurus aculeatus (Causey)

Polydesmus erythropygus (Brandt), McNeill, 1887, Proc. U. S. Natl. Mus. 10:329, fig. 9.

Eutheatus aculeatus Causey, 1952, Nat. Hist. Misc. 106:9-10, fig. 8 (Giant City State Park, Madison Co., Illinois).

Records: *Kentucky,* Carstian Co., Hopkinsville, Nov. 1, 1890; Anderson Co., Tyrone, Apr. 23, July 14, 1892; Fayette Co., Lexington, May 5, 1890; Hopkins Co., Nortonville, Mar. 8, 1881; Powell Co., Natural Bridge, July 21, 1912; Jessamine Co., High Bridge, Jan. 8, 1892; all collected by H. Garman. *Indiana,* Monroe Co., Morgan-Monroe State Park, Oct. 20, 1953, B. G. Owen.

Genus **Singuliurus,** new genus

Resembles *Euryurus* Attems 1938 in the elongated tibio-tarsal region of the male gonopods. Differs from that genus in that the apex of the telopodite is simple rather than bifid and in the absence of a protrusion at the junction of the prefemoro-femoral and tibio-tarsal regions. Apparently indistinguishable from both *Euryurus* and *Auturus* in somatic characters and in habitat, which is rotting wood.

Generotype: *Singuliurus mississippiensis,* new species.

Singuliurus mississippiensis, new species

Figure 2

Male holotype: Width 4 mm., length 27 mm. Colors as in related genera, i. e., triangular areas on the keels and a medial, oval spot on the metazonites are red-orange, the remainder of the dorsum is olive-black, and the legs and venter are white. Other somatic characters are so typical it is doubtful whether any will be useful as diagnostic criteria.

In situ the telopodites of the gonopods are directed cephalad, but the tibio-tarsal region curves mesiad and lies contiguous and parallel with

its mate. As shown in figure 2, the prefemoro-femoral region is setose on the mesial and ventral surfaces, and the tibio-tarsal region is glabrous. There is no enlargement at the junction of these two regions, nor any irregularity in the curvature of the seminal canal there. The seminal canal opens at the apex. The coxae of the gonopods are connected by a short, flexible suture along the ventro-medial surface.

Type locality: Mississippi, Jackson Co., Van Cleave, in rotting log in mixed woods, two males, three larvae of 19 segments, Jan. 1, 1954.

Family Xystodesmidae
Genus *Cheiropus* Loomis 1944

Loomis regards this genus as being closely related to *Zinaria;* however, I find that the stouter body, the absence of sternal processes adjacent to the legs, and the spined coxae are indicative of a closer position to *Apheloria* and its allies than to *Zinaria.*

Cheiropus plancus Loomis

Cheiropus plancus Loomis, 1944, Psyche 51(3-4):171-172, fig. 3 (Thomasville, Thomas Co., Georgia).

Record: *Florida,* Leon Co., Tallahassee, 2202 Amelia Circle, one male, width 9 mm., one female, width 9.6 mm., Harold J. Humm, June 30, 1952.

The color is as follows: caudolateral two-thirds of keels, a wide band across the caudal margin of the metazonites, and a band completely around the collum are red-orange; remainder of dorsum black; head and antennae brown; venter and legs cream.

Genus *Epeloria* Chamberlin 1939
Epeloria bimaculata (McNeill)

Polydesmus bimaculatus McNeill, 1887, Proc. U. S. Natl. Mus. 10:323, pl. 11, figs. 3, 4, [?]5 (Pensacola, Escambia Co., Florida).

Spathoria bimaculata, Chamberlin, 1939, Bull. U. Utah, biol. ser., 5(3):6.

Records: *Florida,* Escambia Co., Pensacola, Cantonment, Molino, under live oaks, Jan. 5, 1954, width of males 6.3-7.6 mm., width of females 6.8-7.4 mm. *Alabama,* Mobile Co., Grand Bay, Alabama Port, June 17, 1953; Spring Hill, Mar., Apr. 1954, mixed woods, width of males 6.3-8.3 mm., width of females 6.3-9 mm. *Mississippi,* Jackson Co., Pascagoula, June 16, 1953; Van Cleave, Jan. 1, 1954, mixed woods, width of males 7.6-7.8 mm., width of females 8.1-8.4 mm.

The populations from the several sites show slight variation in the following details of the gonopods: depth of cleft, width and curvature of both apical branches, abundance and length of setae, length of prefemoral branch. They fall into three geographical groups that may merit subspecific recognition when the genus is better known.

Epeloria fictus Chamberlin

Epeloria fictus Chamberlin, 1943, Proc. Biol. Soc. Wash. 56:37-38, fig. 11 (Thomasville, Thomas Co., Georgia).

Record: *Florida,* Leon Co., Tallahassee, June 1953, male, width 6.9 mm., female, width 8 mm., Harold J. Humm.

Genus *Pachydesmus* Cook 1896
Pachydesmus clarus (*Chamberlin*)

Fontaria clara Chamberlin, 1918, Ann. Ent. Soc. Amer. 11:372 (Creston, Natchitoches Par., Louisiana).

Pachydesmus clarus, Loomis and Hoffman, 1948, Proc. Biol. Soc. Wash. 61:53.

Records: *Louisiana,* Lincoln Par., Ruston, Feb. 15, 1952, W. J. Harman; La Salle Par., Jena, Feb. 28, 1954, J. Stone.

The fully developed color is as follows: dorsum black-brown, keels coral, venter and legs pale yellow. Sternites and coxae unspined; metazonites coriaceous, prozonites smooth.

Genus *Apheloria* Chamberlin 1939
Apheloria adela Chamberlin

Apheloria adela Chamberlin, 1939, Bull. U. Utah, biol. ser., 5(3):10, pl. 4, fig. 34 (Ithaca, Tompkins Co., New York).

Record: *West Virginia,* Pendelton Co., Seneca Rocks, hardwood sawdust pile, Apr. 3, 1954, one male, width 9.8 mm., W. J. Harman.

The color is as follows: legs, keels, and narrow bands on margins of metazonites yellow, remainder of dorsum brown.

Apheloria pinicola Chamberlin

Apheloria pinicola Chamberlin, 1947, Proc. Acad. Natl. Sci. Phila. 99:26, figs. 6, 7 (Pine Mountain, Harlan Co., Kentucky).

Record: *Kentucky,* Bell Co., Pineville, June 15, 1892, H. Garman, two males, width 9.9 mm.

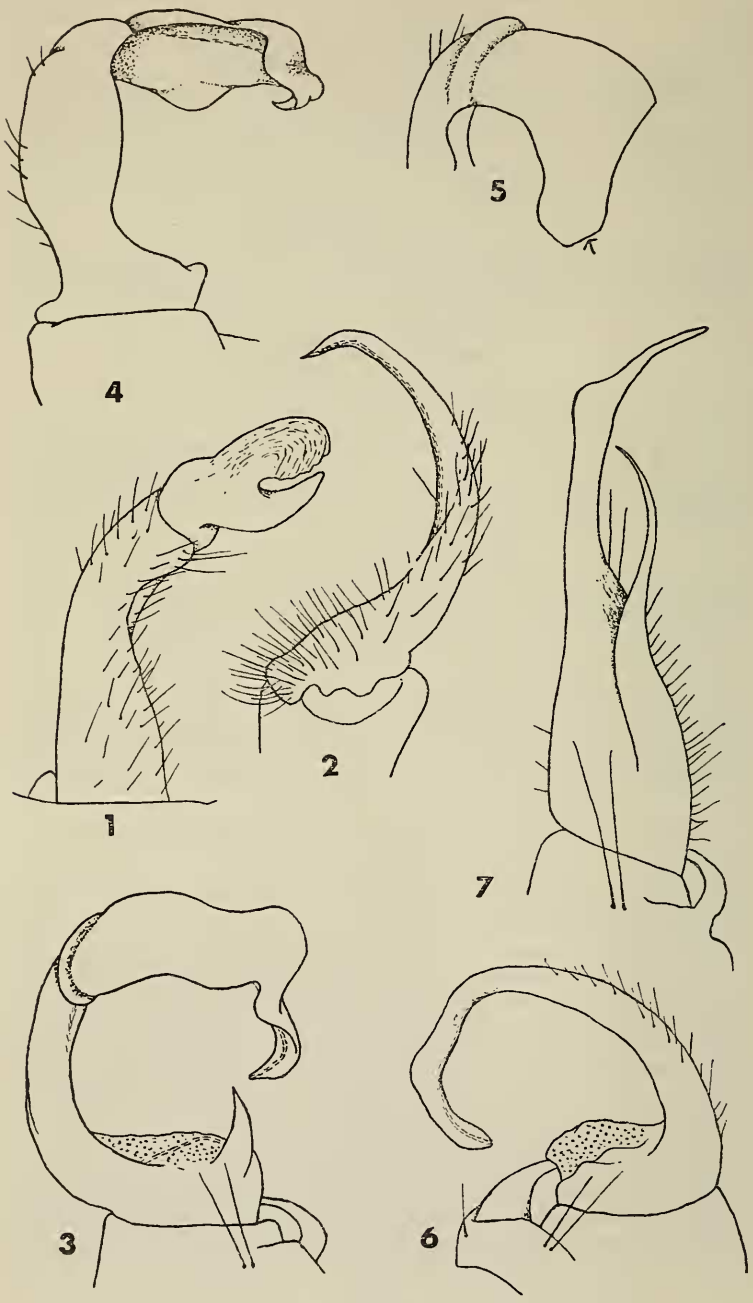
After long preservation and drying the dorsum is brown, and the entire keels and small, medial, oval areas on the metazonites are yellow; in one specimen the collum has four yellow spots, and in the other there are three. The gonopods of this species and of *A. reducta* Chamberlin, 1939, appear to be indistinguishable.

Genus *Brachoria* Chamberlin 1939
Brachoria electa, new species

Figure 3

Diagnosis: Gonopods closely resemble those of *B. etholeta* Chamberlin, 1942, but differ in being more massive and in having a right angle bend at about the middle of the region distad of the transverse furrow.

Male holotype: Width 9.6 mm. No traces of color remain. Keels wide, continuing the slope of the dorsum. Segments 6 through 14 of uniform width. Anterior margin of collum concentric; caudal margin almost straight; anterior margin with a marginal sulcus from the level of the eyes to the caudal margin. Keels of collum extend slightly ventrad of the keels of the second segment. Keels of segments 2 through 19 with a welt on the anterior and lateral margins; pores open dorsad through the welts. Anterior angles of all keels rounded, becoming more so on the posterior segments. Posterior angles of all anterior keels either slightly obtuse or right angles, with the apex narrowly rounded; beginning with segment 16 the posterior angles are acute, and the apex is narrowly rounded. Keels of segment 19 two-thirds as broad and long as those of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18. Anal tergite triangular, the apex narrow, truncated. Mesial margins of anal valves raised; anal scale broadly triangular. Sternites smooth, glabrous; sternites between legs 4, 5, and 6 each with a pair of low mounds; sternites of segments 8 through 17 produced in a ridge, sharp in the middle, between the second legs of each segment. Coxae of all legs behind the eighth with a short, stout spine. Second article of legs with the usual long spine.

Gonopods so broad and heavy they resemble species of *Tucoria*. *In situ* they are directed mesio-cephalad, crossing in the region of the transverse ridge. The narrowed apical region curves mesio-dorsal, so the apices of the two gonopods almost touch. A cephalic view is shown in figure 3. When viewed from below, the region of the telopodite proximad of the transverse ridge is seen to be sigmoidally curved.

Type locality: Kentucky, Anderson Co., Tyrone, one male, Apr. 28, 1892, H. Garman.

Brachoria ethotela Chamberlin

Brachoria ethotela Chamberlin, 1942, Bull. U. Utah, biol. ser. 6(8):5, pl. 2, fig. 13 (Marion, Smyth Co., Virginia).

Records: *Kentucky*, Fayette Co., Lexington, Oct. 1, 1894, one male, width 7 mm., under stones; July 16, 1894, one female, width 12 mm., H. Garman; June 21, 1920, one female, width 9 mm., H. H. Jewett. Madison Co., Richmond road at Kentucky River, May 30, 1892, one male, width 8.3 mm., length about 38 mm. Powell Co., Natural Bridge, May 5, 1895, one male, width 9.1 mm.; Oct. 21, 1911, one male, width 10.1 mm., H. Garman.

Genus *Tucoria* Chamberlin 1943

A key to the genus *Tucoria* was published by Hoffman (1948). The species described here is the fifth known for the genus, all from Kentucky. The closely related genus *Brachoria* is more widely distributed, with species from Maryland to Mississippi. The most reliable character by which to separate the two genera is the nature of the prefemoral process of the male gonopods. In all species of *Brachoria* this process is well developed, cylindrical, acute; while in *Tucoria* it is variable, either almost absent, peg-like, or triangular. In most species of *Brachoria* the

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EXPLANATION OF FIGURES

Fig. 1. *Auturus mcclurkini*, new species. Caudal view of telopodite of right gonopod *in situ*.

Fig. 2. *Singuliurus mississippiensis*, new genus and species. Ventral view of left gonopod.

Fig. 3. *Brachoria electa*, new species Cephalic view of telopodite of left gonopod.

Figs. 4, 5. *Tucoria calceata*, new species. 4. Lateral view of telopodite of left gonopod. 5. Anterior view of distal region of left gonopod.

Fig. 6. *Rudiloria mohicana*, new genus and species. Dorsal view of telopodite of right gonopod.

Fig. 7. *Cibularia profuga*, new species. Subdorsal view of telopodite of left gonopod.

region of the telopodite beyond the transverse ridge is narrow and elongated, but in some it approaches the width that is characteristic of *Tucoria* species.

Tucoria calceata, new species

Figures 4 and 5

Diagnosis: Gonopods closely resemble those of *T. kentuckiana* (Causey, 1942), but are distinguished by the boot-like shape, as viewed from in front, of the region of the telopodite beyond the transverse ridge.

Male holotype: Width 10 mm. No traces of the color remain. Characteristics of the exoskeleton are as described above for *Brachoria electa.*

Gonopods heavy, with the usual transverse ridge and rather obscure apical piece (Fig. 4). *In situ* they are directed mesocephalad, so the mates cross twice, first just below the transverse ridge, and second at the apex. From an anterior view (Fig. 5) the region beyond the transverse ridge is roughly boot-shaped, and the small apical piece, which is attached at the point indicated by the arrow, is not visible. From a lateral view (Fig. 4) the apical process is easily visible and the slight, profemoral protuberance can be seen.

Type locality: Kentucky, Anderson Co., Tyrone, one male, Apr. 28, 1892 H. Garman; in the same collection as the holotype of *Brachoria electa.*

Genus **Rudiloria**, new genus

Resembles *Apheloria* Chamberlin, 1939, in the spined coxae, the absence of sternal processes, and in the long, curved telopodite of the male gonopods. Differs from that genus in the smaller body size and especially in the absence of a prefemoral spur or process on the telopodite of the male gonopods. Other generic characters are given in the description of the generotype, *R. mohicana*, new species.

Fontaria oblonga Koch, 1847, from Pennsylvania is tentatively referred to this genus.

Rudiloria mohincana, new species

Figure 6

Male holotype: Width 6 mm., length about 27 mm. After two years in alcohol the colors are as follows: legs and venter yellow-tan; head, antennae, and dorsum, except for the keels and bands, brown; entire margin of collum yellow; caudal half of caudal tergite yellow; yellow bands of almost uniform width cover the caudal one-third or one-half of the metatergites and are confluent with the yellow triangles, which cover the disto-lateral two-thirds of the keels. Keels wide, continuing the slope of the dorsum as in *Apheloria.* Pores open dorsad or latero-dorsad through the marginal welts. Anterior angles of all keels rounded, more so caudad. Caudal angles of keels of segments 2 through 14 are either a little obtuse or right angles; the keels of segments 15 through 19 are acute, becoming more so caudad; the apex of all keels is narrowly rounded. Keels of segment 19 about one-half as long and two-thirds as wide as those of segment 18. Anal tergite triangular, the apex narrowly truncate. Metazonites finely coriaceous; prozonites smooth. Sternites

smooth, glabrous. Sternites between legs 4, 5, and 6 each with a pair of low mounds. On segments behind the gonopods, there is a slight indication of a sternal spine adjacent to the second pair of legs. Beginning with the legs of about the ninth segment, the coxae bear very short spines. As unsual the spines of the second segment are much longer, becoming more so caudad.

Gonopods (Fig. 6) long, strongly curved as in *Apheloria* species. The distal differentiation of the telopodite closely resembles that of *A. picta* Hoffman, 1949. There is no indication of a prefemoral process. *In situ* the telopodites are directed meso-cephalad; they cross each other and then curve dorsad.

Type locality: Ohio, Ashland Co., Mohican State Park, one male, Aug. 1951, Leroy Gray.

Genus *Cibularia* Chamberlin and Hoffman 1950

Cibularia profuga, new species

Figure 7

Diagnosis: Distal region of acropodite of telopodite abruptly constricted on lateral surface, thus distinguishing this species from *C. tuobita* (Chamberlin, 1910), in which this piece is gradually attenuated.

Male holotype: Width 5.1 mm., length 20 mm. Color as follows: orange triangles on keels, dorsum weak black-brown; venter, legs, and antennae cream. Tergites smooth. Dorsum moderately arched, the keels continuing the slope. Very little of prozonites exposed. Keels of most segments rectangular and very close to the adjacent keels. Keels of segments 2 through 4 directed laterad. Anterior angles of all keels rounded; posterior angles of all keels right except the last 4 or 5 pairs, where they are acute. Keels of segment 18 twice as long and broad as those of segment 19. Anal tergite triangular, the apex narrowly truncate. Annal valves strongly raised along mesial margin. Legs and sternites sparsely setose. Coxae and sternites unspined. Second article of all legs behind gonopods spined. Sternites between legs 3 and 4 each with a pair of inconspicuous, blunt processes.

A subdorsal view of the telopodite of the left gonopod is shown in figure 7. *In situ* the telopodites are subparallel, with both branches crossing each other near the apices. On the ventral surface the telopodite is setose almost one-half its length. Beyond the constriction, or heel, the apical region curves gently dorsad; the apical region of the prefemoral branch curves gently ventrad. The seminal canal opens at the apex of the acropodite.

Female paratype: Width 5.3 mm., length 22 mm. Color incompletely developed. Skeletal details are as in the male except that the posterior angles of the keels become acute on segment 13 rather than on 15 or 16.

Type locality: Arkansas, Montgomery Co., Mt. Ida, five miles south of the Ouachita River bridge, Apr. 14, 1954, three males, three females, one larva, under rocks.

This is the first record of any member of this genus from any state other than New Mexico. The facies, although very difficult to draw or describe, suggests close relationship with *Zinaria* Chamberlin, 1939.

Genus *Mimuloria* Chamberlin 1928

Mimuloria Chamberlin, 1928, Ent. News 39:155. Causey, 1952, Nat. Hist. Misc. 106:7-8.

In this genus the male gonopods are distinguished from those of the closely related *Nannaria* Chamberlin, 1918, by (1) the keel, which is set at a right angle to the end of the telopodite and (2) the flattened, triangular prefemoral branch, usually bearing processes.

Mimuloria castanea (McNeill)

Polydesmus castaneus McNeill, 1887, Proc. U. S. Natl. Mus. 10:329, pl. 12, fig. 8 (Bloomington, Monroe Co., Indiana).

Records: *Indiana,* Monroe Co., Bloomington, three males, width 4 mm., one female, width 4.7 mm., R. W. Siegel. *Missouri,* St. Louis Co., one male, width 3.6 mm., Mar. 9, 1952, E. P. Meiners

Not one of my specimens from Bloomington shows the apex of the telopodite exactly as figured by McNeill; in all of them a keel is attached at a right angle to the flattened end of the telopodite. The St. Louis specimen corresponds closely to the Bloomington specimens in the shape of the prefemoral branch and its short processes; this character may be expected to show some variation when the species is better known.

Mimuloria davidcauseyi (Causey)

Nannaria davidcauseyi Causey, 1950, Ent. News 61(7):194, figs. 3, 4 (Jasper, Newton Co., Arkansas).

Records: *Kentucky,* Fayette Co., Lexington, one male, width 3.4 mm., Apr. 27, 1891; one male, May 18, 1892.

This species is known only from Arkansas and Kentucky. It differs from *M. castanea* principally in the prefemoral branch of the telopodite, which has a robust spine at least half as long as the distance from the origin of the spine to the end of the keel.